

Study Abroad

Edition: 2017 – 2018

Summer Project Research Program

Indicative Research Topics

Dates: May 21 – June 29 (6 weeks)

Credits Received: 3

Introduction:

The aim of the program is to group students with other like-minded students who choose to do research on the below tentative research topics. However, if students wish to run their own research project with their own proposed research topic, it is okay to do so as long as it is validated & pre-approved by a Perrotis professor.

Below is an indicative list of research topics according to specialization. It is only suggestive and not limited to the below list. Please review the below projects and choose your top 3 preferences along with your preference of either working in a group or doing the research on your own.

In order to choose the right project, we will communicate with the candidate directly to find the most suitable fit for each student.

International Food Business:

The overall aim of the research projects is to explore the Greek agro food sector's potential in international markets and more specifically in the US market. The proposed research projects are of practical value for the local SMEs/communities in Greece. They address specific needs and are designed in a way that ensures that the findings will have a maximum impact on the sectors' enterprises. Each projects specific objectives, structure and methodology will be determined in collaboration/agreement between the student and their advisors.

- Food Exports and their importance in Greece's economy
- Extroversion-obstacles/challenges for food SMEs
- Opportunities in international markets for Greek food SMEs
- Current food trends in the international markets
- The US food market for Greek products
- Innovation for Greek food SMEs
- The importance of food SMEs for the country's sustainable development
- Organic vs. Commercial Agriculture
- Agro- Tourism & Rural Development
- The internationalization of wine SMEs in the midst of the economic crisis: pilot case studies from Greece, Albania & FYROM
- An analysis of the perception of Greek food and beverage exporters regarding their export competitive advantages and barriers.

Applied Biological Sciences: Entomology, Public Health, Biology, Ecology, and Genetics:

The European Biological Control Laboratory of the United States Department of Agriculture (EBCL USDA-ARS) operates at the campus of the American Farm School with a large variety of research interests in the fields of entomology, public health, biology, ecology and genetics.

International students are always welcome to participate in research projects at EBCL in order to gain practical experience at a laboratory setting and receive training on the principles of applied biological sciences. Although not a mandatory requirement, visiting students should preferably have a background on agricultural, biological or life sciences, in order to better understand the research interests of our lab.

Potential short research projects will include research topics such as:

- Microscopy and morphological identification of insects
- Principles of molecular biology in the lab - DNA extraction methods, PCR and sequencing analysis
- Use of molecular techniques in identification of insect species
- Phylogenetic analyses of closely related species - evolutionary applications

Food Science & Technology:

- **Quality of Olive Oil**

Olive oil is an important part of the Mediterranean diet and its production plays a significant role for the Greek agrofood sector. The students that will get involved in the project will perform both chemical and sensorial analysis on different olive oil samples that can be found in the Greek market in order to classify them according to the standards set by the EU legislation.

- **Evaluating the Physicochemical and Sensory Characteristics of table Olives**

The students that will get involved in this project will evaluate the physicochemical properties of table olives and will perform sensory analysis on different samples currently sold in the Greek market.

- **Application of Edible Coatings as a means to extent the Shelf life of Fruits and Vegetables**

Biopolymer based packaging is gaining great interest due to the fact that it is an environmental friendly means of extending the shelf life of different products. The students that will get involved in the project will apply biopolymer based edible coatings on fruit and vegetables and they will measure their physicochemical characteristics as a function of storage period.

- **Application of Antimicrobial Coatings as a means to Prolong the Shelf life of Muscle Foods**

Edible coatings can act as active carriers of antimicrobial compounds and in that respect prolong the shelf life of certain products. The students that will get involved in the project will apply biopolymer based edible coatings containing natural antimicrobial agents such as essential oils on muscle foods and will monitor the growth of spoilage bacteria as a function of storage period.

- **Use of Meat Marinating as a means to control Microbial Growth in Muscle Foods**

Nowadays consumers are more aware regarding food safety and there is an increasing demand for the application of new means aiming in the extent of the shelf food of the different food products. The students that will get involved in the project will marinate meat in marinades containing natural antimicrobial agents and will monitor the growth of spoilage bacteria as a function of storage period.

Another group of students will evaluate the effect of marination on physicochemical and sensorial characteristics of meat.

- **Evaluating the antioxidant potential of commercial jams, juices and marmalades**

Nowadays consumers are more aware of the nutritional benefits of different food products and functional food containing various bioactive compounds such as antioxidants are gaining lots of interest. The students that will get involved in this project will evaluate the level of antioxidant agents and the antioxidant capacity of commercial marmalade and jam products currently sold in the Greek market and will also evaluate some of their physicochemical properties

- **Evaluation of the probiotic character of Greek traditional products such as dairy products, table olives and fermented vegetables**

Probiotic food products are in general fermented foods containing an amount of viable and active microorganisms large enough to reach the intestine and exert an equilibrating action on the intestinal microflora. However, it is of great importance to point out that in order to gain the beneficial effects by the consumption of a food product that contains probiotic bacteria, the recommended daily dose is one billion viable cells. The students that will get involved in this project will evaluate the levels of microorganisms with potential probiotic activity in different traditional Greek products currently sold in the market.

- **Growth Kinetics of Molds**

There is currently limited information on the growth kinetics of various molds in matrices containing different hurdles of relevance for the food sector. The students that will get involved in the project will develop growth kinetic models for a selection of molds that are of interest to the food industry.

- **Effect of antimicrobial agents on the growth of *Penicillium commune***

Fungal presence in food may adversely affect its nutritional value, organoleptic properties, appearance and consumer acceptance. Despite great advances on food production standards, spoilage by fungi is still an issue of concern for the industry. The students that will get involved in this project will evaluate the strain variability of eight *Penicillium commune* strains regarding their resistance against different antimicrobial agents.

Environmental Engineering:

- **Water Resource Management: The Water Footprint Approach**

The water footprint (<http://waterfootprint.org>) is an assessment that measures the amount of water used to produce each of the goods and services we use. It can be measured for a single process, such as growing rice, for a product, such as a pair of jeans, for the fuel we put in our car, or for an entire multi-national company. The water footprint can also tell us how much water is being consumed by a particular country – or globally – in a specific river basin or from an aquifer. The students could be informed about the water footprint assessment and apply the methodology to estimate the water footprint of various products or services available at the American Farm School of Thessaloniki.

- **Stormwater Management: Rain Gardens**

A rain garden is a planted depression or a hole that allows rainwater runoff from impervious urban areas, like roofs, driveways, walkways, parking lots, and compacted lawn areas, the opportunity to be absorbed. This reduces rain runoff by allowing stormwater to soak into the ground (as opposed to flowing into storm drains and surface waters which causes erosion, water pollution, flooding, and diminished groundwater). They should be designed for specific soils and climates. The purpose of a rain garden is to improve water quality in nearby bodies of water and to ensure that rainwater becomes available for plants as groundwater rather than being sent through stormwater drains straight out to sea. Rain gardens can cut down on the amount of pollution reaching creeks and streams by up to 30%. The students could be

informed about the principles, the advantages and restrictions of designing rain gardens and then develop projects aiming at the design of rain gardens at the premises of the American Farm School of Thessaloniki.

- **Wastewater Management, Treatment and Reuse**

The wastewater treatment plant (WWTP) of the AFS is a decentralized processing unit. The main objective of this project is the training of students, in order to acquire expertise in environmental protection and sustainable development through the study the environmental footprint of the WWTP of the AFS and the optimization of its operation. More specifically, the students will focus in specific issues regarding saving of energy and resources through wastewater treatment, reclamation and reuse that refers mainly to the irrigation of crops.

Sustainable Agriculture & Environmental Science:

There are several opportunities for research projects at the AgroCenter of Perrotis College an organically certified field.

Here is a list of ongoing research programs in sustainable agriculture.

A. Aromatic & Medicinal Plants Research Program

- a. Effect of mulching & irrigation levels on the production of *Echinacea purpurea* & *Echinacea angustifolia*
- b. Organic cultivation of *Echinacea purpurea* & *Echinacea angustifolia*
- c. Evaluation of different mulching materials on the production of aromatic plants

B. Cover crop systems in Organic Agriculture Research Project

- a. Effect of cover crops on weeds, pests and subsequent crop yield
- b. Developing multispecies cover crop mixes for sustainable soil management and weed suppression in organic agriculture.
- c. No-till vegetable production using cover crops
- d. Nutrient cycling and nitrogen contribution of multispecies cover crop mixtures in organic agriculture

C. Vermicomposting Research Project

- a. Construction of a pilot continuous flow vermicomposting reactor system for animal wastes
- b. Composting food residues in urban settings
- c. Vermicomposting olive mill waste from two-phase olive mills
- d. Evaluation of vermicompost as a soil amendment and fertilizer

D. Soil Microbial Inoculant Research Project

- a. Application of PGPR (Plant Growth Promoting Rhizobacteria) in crop production (lettuce, spinach, tomatoes, peppers, etc)
- b. The effect of mycorrhizal inoculants on the production of aromatic and medicinal plants
- c. Effect of the Inoculation of legumes with rhizobium strains on crop growth and yield